

-5-

Remarks

This application has been reviewed in light of the Office Action of April 1, 2005. Claims 1-17 are pending, and all claims are rejected. In response, claims 1, 9, and 13 are amended; claims 8 and 12 are canceled, without prejudice; and the following remarks are submitted. Reconsideration of this application, as amended, is requested.

Claims 1, 9, and 13 are amended to incorporate the definitions of "cerium oxide" and "cerium-oxide-precursor compound" from the Specification. As such, these amendments do not narrow the scope of the claims, because they state the already applicable definitions.

Claims 9 and 12-17 are rejected under 35 USC 102 over Subramanian US Patent 6,296,945. Applicant traverses this ground of rejection of the claims as amended.

The following principle of law applies to sec. 102 rejections. MPEP 2131 provides: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. The identical invention must be shown in as complete detail as is contained in the ... claim. The elements must be arranged as required by the claim..." [citations omitted] This is in accord with the decisions of the courts. Anticipation under section 102 requires 'the presence in a single prior art disclosure of all elements of a claimed invention arranged as in that claim.' Carella v. Starlight Archery, 231 USPQ 644, 646 (Fed. Cir., 1986), quoting Panduit Corporation v. Dennison Manufacturing Corp., 227 USPQ 337, 350 (Fed. Cir., 1985).

Thus, identifying a single element of the claim, which is not disclosed in the reference, is sufficient to overcome a Sec. 102 rejection.

In the present approach, a cerium-oxide-precursor compound that is not itself cerium oxide with cerium in the +4 oxidation state is deposited on the surface of a primary thermal barrier coating material. The cerium-oxide-precursor compound is thereafter reacted to form cerium oxide with cerium in the +4 oxidation state. The present Specification explains the reasons for this approach and the improved results achieved using this approach, see for example para. [0011]-[0012], and [0029]-[0030].

Subramanian teaches quite a different approach. Subramanian deposits a compound that may be a cerium-containing compound of cerium and oxygen overlying an oxide thermal barrier coating material, and then reacts the cerium-containing compound

with the thermal barrier coating material to make a more-complex oxide. Subramanian uses the term "precursor" to mean something very different from its use in the present claims. In the present application, the term "precursor" refers to a compound that reacts to form cerium oxide, while in Subramanian it refers to a cerium-oxygen compound that is reacted with another oxide to form a reaction product; thence the cerium-oxygen compound is a precursor to the reaction product.

Amended claim 9 recites in part:

"infiltrating a cerium-oxide-precursor compound from an exposed surface of the primary ceramic coating into the primary ceramic coating, wherein the cerium-oxide-precursor compound is not cerium oxide with cerium in a +4 oxidation state, and

heating the cerium-oxide-precursor compound to form cerium oxide with cerium in the +4 oxidation state adjacent to the exposed surface of the primary ceramic coating." [emphasis added]

Subramanian has no such disclosure. There is no disclosure that the cerium-oxygen compound is not cerium oxide with cerium in the +4 oxidation state, and there is no disclosure that upon heating the cerium-oxide-precursor compound the result is cerium oxide with cerium in the +4 oxidation state.

Similarly, claim 13 recites in part:

"a sintering-inhibitor region at a surface of the primary ceramic coating, wherein the sintering-inhibitor region comprises cerium oxide with cerium in the +4 oxidation state in a concentration greater than a general cerium oxide concentration in the primary ceramic coating." [emphasis added]

Subramanian has no such disclosure. Subramanian does not disclose that the cerium is in the +4 oxidation state.

The explanation of the rejection in regard to now-canceled claim 12 (Office Action, page 3, lines 1-3), which recited the +4 oxidation state, references col. 2, line 65-col. 3, line 10 and col. 5, lines 40-50 to support the rejection of the +4 oxidation state limitation. These portions of Subramanian make no reference to the oxidation state, and give no composition suggesting that cerium might be in the +4 oxidation state. Subramanian teaches C_zO_w compounds as precursors of another reaction - without ever defining z and w when $C=Ce$ -

-7-

not as the reaction product of a precursor compound of cerium oxide. Subramanian's reaction product is an oxide of A and C or B and C (col. 5 lines 44-45), without any suggestion that there might be cerium in the +4 oxidation state. The selection of the +4 oxidation state is not a matter of design choice, because Subramanian does not present any such design choice. All of Subramanian's discussion is in general terms, without setting forth specific compounds and valence states.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

Claims 1-5 and 7-8 are rejected under 35 USC 103 as unpatentable over Subramanian '945. Applicant traverses this ground of rejection.

The following principle of law applies to all sec. 103 rejections. MPEP 2143.03 provides "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." [emphasis added] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not found in any of the applied prior art, the rejection cannot stand. In this case, the single applied prior art reference clearly does not arguably teach some limitations of the claims.

Claim 1 recites in part:

"depositing a cerium-oxide-precursor compound onto an exposed surface of the primary ceramic coating, wherein the cerium-oxide-precursor compound is not cerium oxide with cerium in a +4 oxidation state, and

heating the cerium-oxide-precursor compound in an oxygen-containing atmosphere to form cerium oxide with cerium in the +4 oxidation state adjacent to the exposed surface of the primary ceramic coating." [emphasis added]

As discussed above in relation to the rejection of claim 9, which discussion is incorporated by reference, Subramanian teaches deposition of a compound that may be a

cerium-containing compound of cerium and oxygen overlying an oxide thermal barrier coating material, and then reacts the cerium-containing compound with the thermal barrier coating material to make a more-complex oxide. Subramanian uses the term "precursor" to mean something very different from its use in the present claims. In the present application, the term refers to a compound that reacts to form cerium oxide, while in Subramanian it refers to a cerium-oxygen compound that is reacted with another oxide to form a reaction product; thence the cerium-oxygen compound is a precursor to the reaction product.

Thus, Subramanian has no teaching that the cerium-oxide-precursor compound is not cerium oxide with cerium in a +4 oxidation state, and that heating in an oxygen-containing atmosphere forms cerium oxide with cerium in the +4 oxidation state.

The explanation of the rejection in regard to now-canceled claim 8 uses the same argument as used in regard to claim 12, and Applicant's response set out above is incorporated here. There is no teaching in Subramanian of producing cerium in the +4 oxidation state. The selection of the +4 oxidation state achieves important advantages as set forth in para. [0012] and [0030] of the present Specification. The selection of the +4 oxidation state is not a matter of design choice, because Subramanian does not present any such design choice. All of Subramanian's discussion is in general terms, without setting forth specific compounds and valence states.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

Claim 10 is rejected under 35 USC 103 over Subramanian, and further in view of Taylor US Patent 5,520,516. Applicant traverses this ground of rejection.

Claim 10 depends from claim 9, and incorporates its limitations. Subramanian does not teach these limitations for the reasons stated above, and which are incorporated here. Taylor adds nothing in this regard.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

Claims 6 and 11 are rejected under 35 USC 103 over Subramanian in view of Ueda US Patent 5,697,992. Applicant traverses this ground of rejection.

Claim 6 depends from claim 1, and claim 11 depends from claim 9. Subramanian does not teach the limitations of the parent claims, and Ueda adds nothing in this regard.

Ueda teaches that ammonium cerium sulfate may be calcined to cerium oxide, but that information has no relevance at all to the teachings of Subramanian. Subramanian never teaches converting anything to cerium oxide, but in fact starts with a cerium-oxygen

compound of the form C_zO_w , without ever defining z and w when $C=Ce$, and then reacts the cerium-oxygen compound with another oxide to get a more-complex oxide reaction product. See, for example, col. 2, line 57-col. 3, line 25. Consequently, there is no motivation or objective basis for combining the teachings of these references.

CONCLUSION

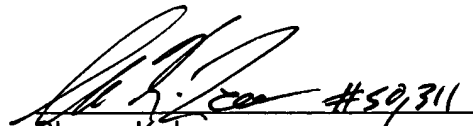
In view of the above, Applicant respectfully requests reconsideration of the Application and withdrawal of the outstanding objections and rejections. For at least the reasons presented herein, Applicant respectfully submits that pending claims 1-7, 9-11, and 13-17 are not anticipated by nor rendered obvious in view of the cited art, either alone or in combination, and thus, are in condition for allowance. Applicant requests allowance of all pending claims in a timely manner. If the Examiner believes that prosecution of this Application could be expedited by a telephone conference, the Examiner is encouraged to contact the Applicant's undersigned representative.

This Response has been filed within three (3) months of the mailing date of the Final Office Action and it is believed that no fees are due with the filing of this paper. In the event that Applicant is mistaken in the calculations, the Commissioner is hereby authorized to deduct any fees determined by the Patent Office to be due from the undersigned's Deposit Account No. 50-1059.

Dated: June 1, 2005

Respectfully submitted,

McNees Wallace & Nurick LLC

A handwritten signature in black ink, appearing to read "Shawn K. Leppo", with the number "#50,311" written to the right of the signature.

Shawn K. Leppo
Reg. No. 50,311
100 Pine Street
P.O. Box 1166
Harrisburg, PA 17108-1166

Phone: (717) 237-5218
Fax: (717) 237-5300